FLOOD Safe

Valuable Reference - Save for Future Use

Information about future flood damage prevention

A publication of FEMA Region IX Mitigation & Arizona's Division of Emergency Management

What's Inside

Helpful Websites

Arizona Division of Emergency Management
www.dem.azdema.gov/

Arizona Emergency Information Network
www.azein.gov

National Flood Insurance Program
www.fema.gov/business/nfip/

DisasterAssistant.gov
www.disasterhelp.gov

Flood Safe

Flood Safe is published by the Arizona Division of Emergency Management and Mitigation Division at FEMA Region IX.

Arizona Division of Emergency Management

FEMA

Roosevelt Estates Flood-Damaged Homes Replaced with Open Space

Topographical map of Roosevelt Estates area. Affected site where Campaign Creek and Pinto Creek converge is highlighted.

Silt and debris flowed through this home in Roosevelt Estates during the September 2003 flood, triggering the mitigation acquisition.

Gila County, AZ

History of the Area: Theodore Roosevelt Lake was formed by the construction of a masonry dam on the Salt River in 1911, making it the oldest artificial reservoir in Arizona. About ten miles of the original river are now beneath the waters. Many homes were constructed in the 1960s along the south of the lake and many of these homes are subject to repetitive damage from flash flooding. Roosevelt Estates is one of the communities in this area.

Flood Damage: Near the corner of Ash Street and Palo Verde Drive, the geographic low point of the Roosevelt Estates, six homes were flooded by the 2003 monsoon storms, three of them suffered substantial damage, and two of the three were left uninhabitable. This is the area where Campaign Creek and Pinto Creek converge. During that storm six to 12 inches of rain fell in a 12-hour period. Altogether 20 homes lost all utilities for one day and phones were out for one week. The damage zone was eight miles square in size.

This area, and these homes, had been damaged repetitively in flooding events because of their location near the confluence of the two major drainages.

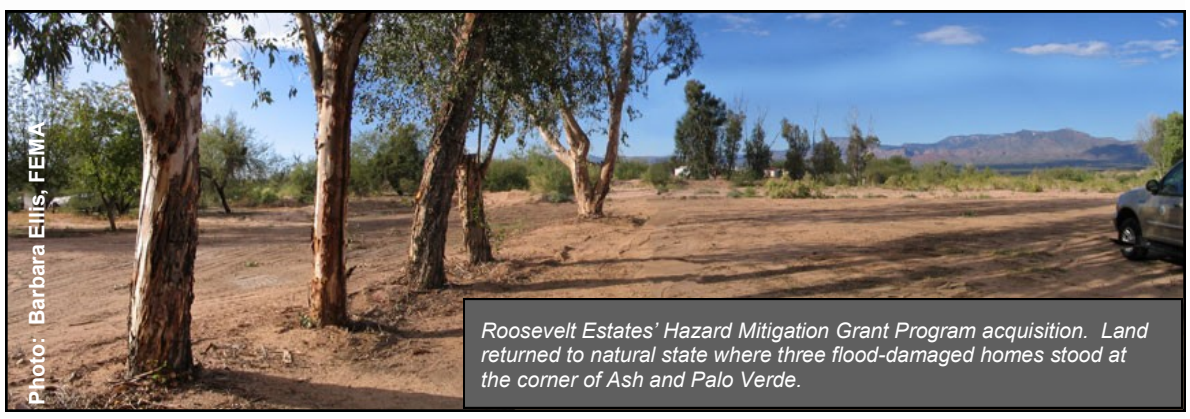
Funding Source for the Project: In the summer of 2002 the largest, most severe fire in Arizona history, the Rodeo-Chediski Fire, burned nearly a half-million acres of wilderness and triggered a Presidential Disaster Declaration for Arizona. Gila County received hazard mitigation funding due to that disaster and applied to the State and FEMA for grant money to purchase the flood-damaged homes and return the lots to a natural state.

Budgeting their limited funds, not all of the affected properties could be purchased at this time. Mariano Gonzalez, Jr., Former Deputy Director of the Division of Governmental Relations and Emergency Management for Gila County, served as project manager for the acquisition. "Five homes had initially been targeted [for acquisition] but the three [with most damage] had 50% destruction [in the 2003 floods]," Gonzalez explained. One house had an external wall damaged, and another house was moved from its foundation.

Costs & Benefits: The costs for purchasing the three homes totaled $298,388.45, including appraisal and escrow fees. With a total assessed value of $265,000 for the three homes, the savings from damages prevented (to these three properties alone) from floods occurring in 2005 and 2006 equals more than one-half of a million dollars.

Results: Today the acquired property shows no sign of having been built upon. Cottonwoods, Eucalyptus trees and native Chaparral grow among the rocks. Additionally, Gila County has placed a permanent deed restriction on the properties, preventing any future development except for public facilities associated with open space or recreational uses.

Dark area (indicated within yellow line) shows where floodwaters stood during and following summer monsoon floods of 2006. This is the location of one of the acquired homes.



Roosevelt Estates' Hazard Mitigation Grant Program acquisition. Land returned to natural state where three flood-damaged homes stood at the corner of Ash and Palo Verde.

The Problem with Mold

One problem that often occurs after a flood is the development of mold. Mold growths, or colonies, can start to grow on a damp surface within 24 to 48 hours. Molds digest organic material, eventually destroying the material they grow on. In addition to the damage molds can cause in your home, they can also cause mild to severe health problems.

If your home has water damage due to flooding, sewage backup, plumbing or roof leaks, damp basement, overflows from sinks or bathtub, or high humidity, mold and mildew will develop within 24-48 hours of water exposure. Even worse, it will continue to grow until steps are taken to eliminate the source of moisture and effectively deal with the mold problem.

Cleaning Up & Drying Out Your Home

If your house or its understructure have been under water from the recent flooding, you will need to take important steps to clean out bacteria and mold, and dry out the building thoroughly.

Steps for drying out the house

- Turn off the main power
- Open up the house to allow moist air to escape.
- Remove all wet furniture, contents and carpets or rugs. If you decide to keep some of these items they must be cleaned and disinfected.
- Discard all contaminated food products.

Interior Walls: Interior plaster walls will need to be drained if they are still holding water. Remove the baseboard trim and drill holes about 2" above the floor to let the water out. The holes can be hidden behind the reinstalled baseboards. Flood-soaked sections of wallboard will usually have to be removed and thrown away. Paneled walls can usually be dried out by prying out the bottom corner of the paneling and propping it out away from the wall studs.

Exterior Walls: Insulation in exterior walls will hold moisture and bacteria. It is important to remove any flood soaked insulation as soon as possible so the other building materials can dry out properly. Batt insulation and blown-in insulation cannot be reused in your repairs and must be thrown away. Rigid foam insulation can be removed and disinfected. Once it is completely dry it can be reinstalled in the wall cavity. Once the insulation is removed, the wall must be disinfected and thoroughly dried. Dehumidifiers and portable heaters can speed up this process.

Floor Framing: If the flood waters got into your floor framing but not into your house, you will need to check for wet floor insulation. Wet floor insulation must be removed and the framing disinfected and dried out in the same manner as the walls.

Disinfecting: Disinfect all surfaces that were soaked by flood waters with "disinfecting" or "sanitizing" products. An alternative is to use a mixture of 1/4 cup liquid chlorine bleach mixed into one gallon of water. Remove mildew using household mildew removers or fungicides.

Reconstruction: Reconstruction materials should be water-resistant. Instead of regular wallboard or plaster, use water-resistant or waterproof wallboard for interior wall surfaces. Install wallboard horizontally. Use rigid foam insulation instead of batt or blown-in insulation. Use galvanized or stainless steel hardware. Use indoor-outdoor carpeting. Use exterior grade plywood for sub-floor reconstruction.

Cleaners

1st choice: Non-sudzing household cleaners
2nd choice: Laundry soap or detergent

Disinfectants

1st choice: Commercial disenfectants or sanitizers, such as the quaternary, phenolic, or pine oil based ones. (Check labels for the contents).
2nd choice: 1/4 cup (2 ounces) of laundry bleach for 1 gallon on water.

Mildew Removers

1st choice: Commercial mildew removers or mildewicides
2nd choice: Washing soda or tri-sodium phosphate (available at grocery or paint stores). Use 5 tablespoons per gallon of water.
3rd choice: 1/4 cup (2 ounces) of laundry bleach for 1 gallon of water. See next section on using bleach.

Bleach

Liquid chlorine bleach, such as Clorox or Purex bleach, can do a variety of flood clean up jobs. Make sure that 5.25% sodium hypochlorite is the only active ingredient. Bleach that has a scent added to improve its smell is available. Scented bleach is fine for cleanup jobs, but don't use it to treat drinking water. Don't use dry bleach or any bleach that does not contain chlorine.

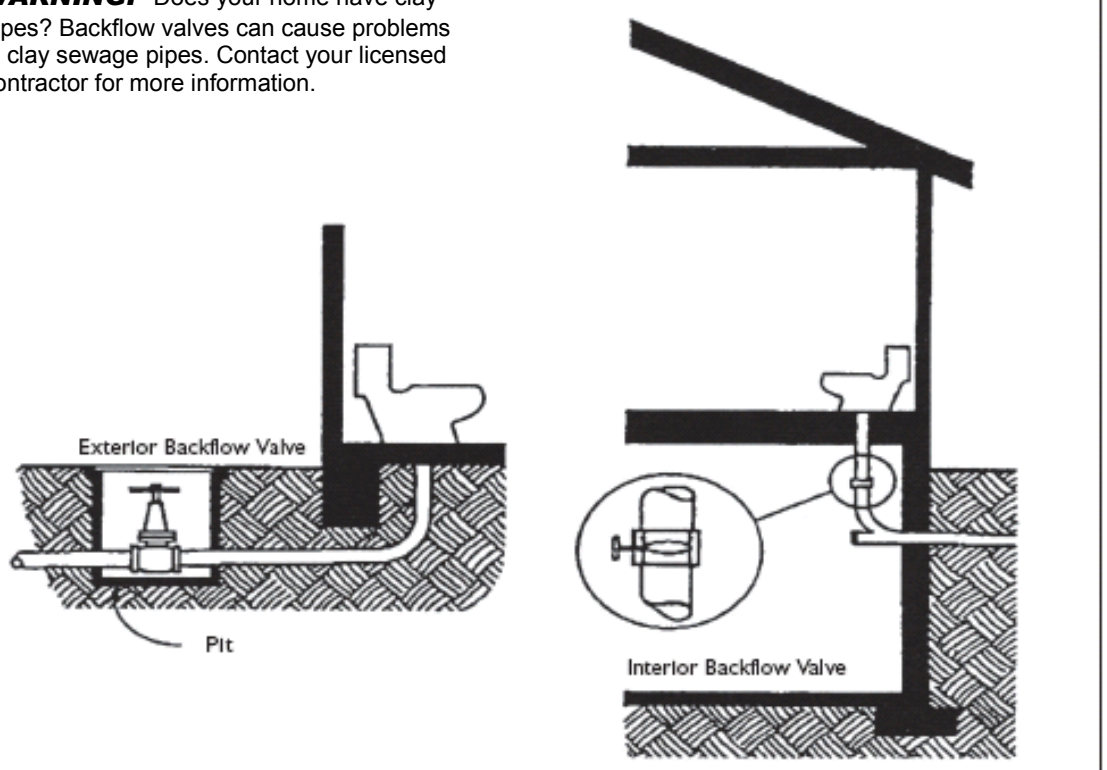
Be careful of fumes and wear rubber gloves. Read the safety instructions on the label. Do not mix bleach with other household chemical products, especially ammonia or toilet bowl cleaner; the chemical reaction can create a poisonous gas. Do not use bleach on aluminum or linoleum.

Protecting Your Home From Backflow

The average sewage/septic system is designed to remove sewage from a house. If flood-water enters the system, the sewage can back up and enter your home. To help prevent this, install a backflow valve in the sewer line. The backflow valve is opened by the flow of sewage exiting your home, but closes when the flow reverses, preventing sewage from backing up into your home. Keep these points in mind when considering installing a backflow valve:

- For your own safety, changes to the plumbing in your house must be done by a licensed plumber or contractor, who will ensure that the work is done correctly and according to all applicable codes.
- Some valves incorporate the advantages of both flap and gate valves into a single design. Your plumber or contractor can advise you on the advantages and disadvantages of the various types of backflow valves.
- Valves should be installed on all pipes that leave the house or that are connected to equipment that is below the potential flood level. Such valves may be needed on washing machine drain lines, laundry sinks, fuel oil lines, rain downspouts, and sump pumps, as well as sewer/septic connections.
- If you have a sump pump, it may be connected to underground drain lines, which may be difficult to seal off.

WARNING: Does your home have clay pipes? Backflow valves can cause problems in clay sewage pipes. Contact your licensed contractor for more information.



Recommendations for Private Domestic Wells Impacted by flooding

What should I do if my well has been flooded?

If you live in an area that was recently or is currently flooded, your private well may be in danger of contamination. In general, if flood waters have reached your well, or if you notice any change in the appearance or taste of your water, or even if you are unsure about the impact of flooding on water quality in your area, you should boil all the water you use for drinking, cooking or bathing. If you are unable to boil the water, you can purchase bottled water for drinking purposes or follow disinfection procedures outlined below.

Why should I be concerned about the safety of my well water?

Surface waters are susceptible to many sources of contamination. This is particularly true during a flood event where sewage runoff and overflow from lakes, rivers and streams may be carrying bacteria, protozoa, or viruses.

Is there danger of electrical shock if my well was submerged by floodwaters?

Yes, in addition to the danger of electrical shock you can also damage your well or pump by turning it on after it has been submerged. You will need to conduct a well and pump inspection before operating your well. After the flood waters have receded and the pump and electrical system has dried, do not turn on the equipment until the wiring system has been checked by a qualified electrician, well contractor or pump contractor.

What does it mean if my well water is cloudy or muddy?

Cloudy or muddy water is an indication that your well has been impacted by surface water. You should run water from an outside spigot with a hose attached until the water becomes clear and free of sediments. Once the water has cleared you will need to disinfect your well by following the instructions below or contacting a qualified well or pump contractor.

Can my well be contaminated even if it was not flooded?

Yes, your well can be contaminated even if it has not been submerged by floodwaters. Older wells, wells that are less than 50 feet deep, and those located close to surface waters can become contaminated from underground water.

Is my water safe to drink after the flooding subsides?

No, if your well has been flooded, you must first disinfect it. You can disinfect your well by following the instructions below or by contacting a qualified well or pump contractor.

Emergency disinfection of wells that have been impacted by flooding:

Materials needed:

- One gallon of recently purchased non-scented household liquid bleach
- Rubber gloves
- Eye protection
- Old clothes
- Funnel

Relocating Your Electrical Box

Elevate the bottom of the electrical box to a minimum of 1-foot above the 100-year flood elevation (Fig. A) or relocate the electrical box to an upper floor (Fig. B). The Arizona Revised Statutes, Title 48, defines the Regulatory Flood Elevation as 1-foot above the 100-year (Base) flood elevation.

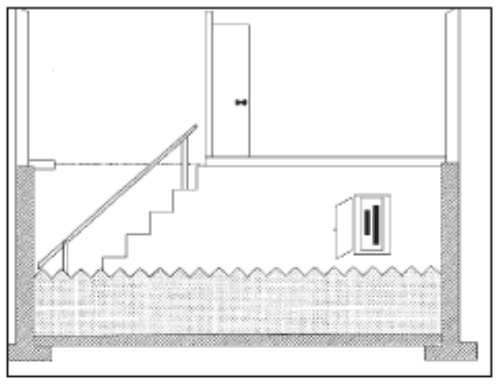


Figure A

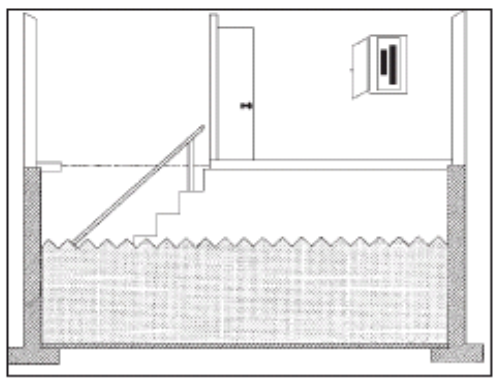


Figure B

Step 1: Determine the type of well you have and how to pour the bleach into the well. Some wells have a sanitary seal with either an air vent or a plug that can be removed. If it is a bored or dug well, the entire cover can be lifted off to provide a space for pouring the bleach into the well.

Step 2: Take the gallon of bleach and funnel and carefully pour the bleach down into the well casing.

Step 3: After the bleach has been added, run water from an outside hose into the well casing until you smell chlorine coming from the hose. Then turn off the outside hose.

Step 4: Turn on all cold water faucets inside and outside of the house until the chlorine odor is detected in each faucet, then shut them all off. If you have a water treatment system, switch it to bypass before turning on the indoor faucets.

Step 5: Wait at least eight hours and up to 24 hours before turning the faucets back on. It is important not to drink, cook, bathe or wash with this water during the time period as it contains high amounts of chlorine.

Step 6: Once the waiting period has passed, turn on all faucets inside the house. Turn on an outside spigot with a hose attached and run the water into a safe area where it will not disturb plants, lakes, streams or septic tanks. Run the water until there is no longer a chlorine odor. Turn the water off.

Step 7: The system should now be disinfected.

Step 8: Have your water tested for bacteria by a licensed laboratory. For a list of licensed laboratories in your area contact the Arizona Department of Health Services at (602) 364-0720.

CAUTION: Because of the speed and direction of groundwater flow affected by flooding, your well may not be a safe source of water for many months after the flood. The well can become contaminated with bacteria or other contaminants. Waste water from malfunctioning septic tanks or chemicals seeping into the groundwater can contaminate the groundwater even after the water was tested and found to be safe. It will be necessary to take long range precautions, including repeated testing, to protect the safety of drinking water. Surface water can also enter your well through the underground aquifer particularly during flood events. If surface water enters your well it may contaminate the water that you rely on for drinking, cooking, washing and bathing.

Do You Need Flood Insurance?

How do I know if I am in the Floodplain?

The floodplain is identified as "Special Flood Hazard Areas" in your community's Flood Insurance Study and the accompanying Flood Insurance Rate Maps (FIRMs). The flood level shown for these Special Flood Hazard Areas has a 1% chance of being equaled or exceeded in any one year. That translates into a 26% chance of flooding over a typical 30-year mortgage period as compared to a 1% chance of fire damage over the same period. The building permit or the floodplain management officials in your community have the FIRMs available for you to review.

What is Substantial Damage?

Substantial Damage is damage, of any origin, to a structure where the cost of restoring the structure to its before-damage condition would equal or exceed fifty percent (50%) of its pre-damage value.

When does the NFIP affect me?

The NFIP requires participating communities to regulate, with permits, any new or substantially improved structures during non-disaster periods and to monitor and identify any substantially damaged structures as a result of a disaster within the community's FEMA mapped flood prone areas. Participating communities adopt an ordinance that requires any new or substantially improved buildings to be elevated at or above the Arizona Regulatory Flood Elevation (1-foot above the 100-year base flood elevation) within an identified floodplain. Nonresidential buildings have the additional option of being dry flood-proofed. Existing buildings that are substantially damaged or improved (50% or more) must be elevated or flood-proofed to meet the same construction code standards as new construction. When you apply for a local building permit you will be informed if you are in a floodplain and what further steps are required to repair or reconstruct your building. If your building was flooded, but not substantially damaged, there is a wide range of inexpensive measures described in the booklet titled "Repairing Your Flooded Home" that can help you reduce future flood damage.

Photo: Yavapai Co. FCD

Counterpoint

Why go through all this trouble?

First, typical homeowner and business insurance does not cover damage caused by a flood. Second, as a participating community in the National Flood Insurance Program (NFIP), your community is required to enforce its floodplain regulations. Third, structures located in the floodplain that are not elevated or flood-proofed are a threat to the health and safety of the occupants. Fourth, structures that do not take into consideration the flood risks will repeatedly need to be bailed out by the government (usually through the NFIP or various disaster assistance programs) when flooding reoccurs.

What happens if I refuse to comply?

If you do not obtain a permit and do not elevate or flood-proof, then your community could take legal action against you. This could include halting development, revoking the permit, imposing a fine, or withholding a certificate of occupancy. If the structure is in violation of the regulations, flood insurance premiums could be extremely costly, possibly making the structure difficult to sell. Also, your entire community could be placed in jeopardy by suspension or probation by the NFIP resulting in no flood insurance policies and flood disaster assistance available in your community.

What if I have more questions?

Your building permit and floodplain management officials are responsible for implementing the requirements of the local floodplain management ordinance, including the substantial damage provisions. Following a disaster declaration, the requirements pertaining to substantial damage will be presented to community officials in detail at meetings held in various locations throughout the state. FEMA will work with building officials to help them identify structures which may qualify as substantially damaged. In addition, FEMA will provide technical assistance to local building officials concerning the repair or reconstruction of substantially damaged structures.

What is the National Flood Insurance Program?

The National Flood Insurance Program (NFIP) is a federal program enabling property owners to purchase flood insurance. It is based on an agreement between your community and the federal government. The agreement states that if your community adopts and enforces floodplain management regulations that at least meet minimum state and federal requirements, the federal government will make flood insurance and flood disaster assistance available in your community.

How Do I Purchase Flood Insurance?

Flood insurance is available only to residents of communities participating in the NFIP. For more information and to find out if your community participates in the NFIP, call 1-800-427-4661.

If your community is participating in the NFIP, you can purchase insurance for insurable structures. All insurance agents can sell flood insurance policies. If your agent is not aware of the procedures for selling flood insurance policies, please call 1-800-720-1093 for a referral to an insurance agent in your area who writes NFIP policies. You can also find a local insurance agent at: www.floodsmart.gov.

How Do I File A Flood Insurance Claim?

If you experienced flood damage and are covered by flood insurance, these important steps will help you when filing your flood insurance claim.

1. Save as many damaged articles as possible. If you must throw items out, take pictures to document your losses.
2. Contact your insurance agent right away.

Once your insurance agent has your claim:

1. The agent will file a Notice of Loss.
2. An adjuster will be assigned to your case.
3. Once the loss has been adjusted, a Proof of Loss will be submitted, and payment can be made. Partial payment can be made to claimants upon submission of a partial Proof of Loss.

Do I Still Need to Make an Application to FEMA Disaster Assistance?

All property owners who had flood damages caused by a federally declared disaster should register for disaster assistance. The applications are routed through the different disaster programs and homeowners are notified if they are eligible for assistance beyond their flood insurance claim.

Flood Insurance Rating Example

The charts below give an example of typical rates one can expect to pay for flood insurance. The cost of insurance is proportional to the flood risk. This is determined by comparing the flood zone, as shown on a FEMA Flood Insurance Rate Map (FIRM) with the structure's elevation above the Base Flood Elevation (BFE). In other words, the higher the structure is above the base flood, the lower the rate!

The chart on the left, "Post FIRM Construction," shows average rates for $100,000 of coverage on a single family home built after the community's FIRM was adopted. For example, if your home was built in 2000, your premium will reflect your home's flood zone and its elevation above the "BFE" as depicted on the maps in effect in 2000.

Similarly, the chart on the right, "Manufactured (Mobile) Homes," shows the rates for a typical manufactured home (valued at $60,000) in an existing manufactured home park.

Post FIRM Construction	
3 ft. above BFE	$196
2 ft. above BFE	$231
1 ft. above BFE	$351
0 ft. at BFE	$521
1 ft. below BFE**	$1601
2 ft. below BFE**	$1790
3 ft. below BFE**	$2140

Manufactured (Mobile) Homes	
3 ft. above BFE	NA
2 ft. above BFE	$194
1 ft. above BFE	$345
0 ft. at BFE	$735
1 ft. below BFE**	$1036
2 ft. below BFE**	$1276
3 ft. below BFE**	$1662

Annual premiums as of September 2003 **can be higher depending on how risk exposure is reviewed by FEMA

Myths and Facts about the National Flood Insurance Program (NFIP)

Question: Who can buy flood insurance?

Answer: Everyone in a community that participates in the National Flood Insurance Program (NFIP).

The NFIP has compiled the following list of common myths about the program, and the facts behind them, to give you the full story about this valuable protection.

Myth: Homeowner's insurance policies cover flooding.

Fact: Unfortunately, many homeowners do not find out until it is too late that their homeowner policies do not cover flood damages. Only a separate Flood Insurance Policy covers damage to your home and belongings caused by flooding.

Myth: Federal flood insurance can only be purchased through the NFIP (FEMA) directly.

Fact: NFIP flood insurance is sold through private insurance companies and agents and is backed by the federal government.

Myth: Only residents of high-risk flood zones need to insure their property.

Fact: Even if you live in an area that is not floodprone, it is advisable to have flood insurance. Over 25% of the NFIP's claims come from outside high flood-risk areas. If you live in an area not shown as a floodplain, not only can you buy insurance, but the rates you pay will be less than if you lived in a mapped floodplain.

Myth: You can't buy flood insurance if you are located in a high flood-risk area.

Fact: You can buy flood insurance no matter where you live—as long as your community participates in the NFIP. The NFIP provides affordable flood insurance coverage for any walled and roofed building whether it is in a mapped floodplain area, or in areas where no floodplain map exists.

Myth: The NFIP does not offer basement coverage.

Fact: Yes, it does. While flood insurance does not cover basement improvements such as finished walls, floors or ceilings, or personal belongings that may be kept in a basement, such as furniture or other contents, it does cover structural elements, essential equipment and other basic items normally located in a basement. The following items are covered in a basement, as long as they are connected to a power source and used as intended:

- Sump pumps
- Well water tanks and pumps
- Oil tanks and the oil in them
- Gas tanks and the gas in them
- Furnaces, water heaters, air conditioners, and heat pumps
- Electrical junction and circuit breaker boxes, and required utility connections
- Foundation elements
- Stairways, staircases, and elevators
- Unpainted drywall and sheet rock walls and ceilings and fiberglass insulation
- Cleanup
- Clothes washers and dryers and food freezers (with contents coverage only)

Myth: Federal disaster assistance will pay for any flood damage.

Fact: Before a community is eligible for disaster assistance, it must be declared a Federal disaster area. Federal disasters are only declared with a request from the governor following widespread and devastating flooding. The premium for a NFIP policy, averaging $360 a year nationally, is less expensive than the annual interest paid on a federal disaster loan.

Private Well Water and Your Health

What is in my water?

Depending on the geology and land use in your area, certain minerals or chemicals may be present in your water. Some may cause potentially adverse health effects depending on the concentration, amount and composition of the chemical. Knowing about your surroundings gives you good clues as to what is in your water, but each well can produce water with different qualities.

Have you had your well tested to know what is in your water?

Is it safe to consume well water before it is tested?

The Arizona Department of Health Services recommends that people do NOT use their well water for drinking or cooking before testing.

Who is responsible for testing private wells?

There are no laws or regulations pertaining to the water quality of private wells, hence there is no agency that is responsible for enforcing water quality standards on private wells. The responsibility to test private wells falls on the individual consumers of the well water. A *private* well is a well that serves less than 25 people and has less than 15 connections.

How often should I test my private well?

The Arizona Department of Health Service recommends that private wells be tested for bacterial contamination once a year and for primary metals prior to initial use and after a major event such as a flood, drought, or fire. When was the last time your well was tested for chemicals such as arsenic, copper, lead, bacteria, and nitrates?

How do I test my well?

You can contact the Arizona Department of Health Services Environmental Laboratory Program at (602) 364-0720 to help you locate laboratories licensed for drinking water analyses and that follow proper laboratory procedures.

Contact Information and Resources

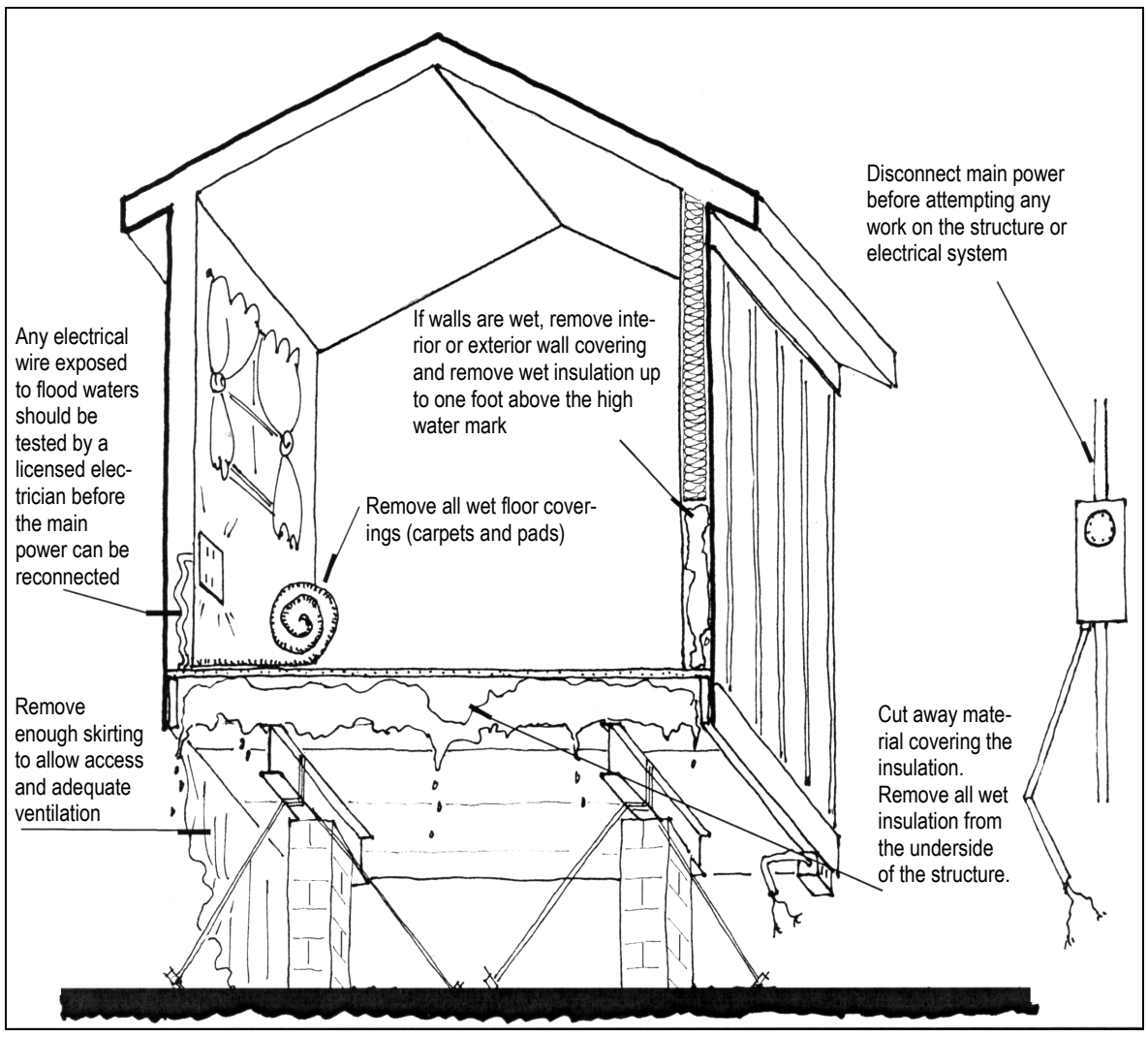
- Arizona Department of Health Services, Office of Environmental Health: Phone: (602) 364-3118 or (800) 367-6412
- ADHS Website: www.azdhs.gov
- ADHS Environmental Laboratory Program: Phone: (602) 364-0720

Post-Flood: Minimizing Flood Damage to Manufactured Homes

If your manufactured home had flood waters inside the structure for a short period of time, it may be possible to minimize the amount of structural damage by quickly removing the wet materials and drying out the structure. If the insulation under your manufactured home got wet from flood waters, it's important that the structure is thoroughly dried. Wet insulation can wick moisture into the flooring, causing warping and structural problems.

The following is a list of suggested actions to take immediately after flooding has occurred.

- Have gas line systems tested for leakage.
- Remove skirting around home to allow drying.
- Have a registered installer check soils around footings for washout or scouring, check shims and piers for stability, check anchors (if installed) for stability from soil withdrawal.
- Check drain/waste lines for proper slope and leaks.
- Remove bottom board (belly paper) to allow drying of insulation, decking, structural lumber. If necessary, replace damaged insulation and belly paper with similar material.
- Loosen siding or sheathing to allow for drying of construction materials and insulation in order to avoid decay and bacterial growth.
- Check for water in ductwork and remove.
- Have an electrical contractor check all affected electrical system items for damage.
- Check and clean water lines.
- Check furnace.
- Check water heater.



Community Emergency Response Training (CERT)

Overview

CERT training is a Federal Emergency Management Agency initiative that educates citizens about the hazards they face in their community and trains them in life safety and other emergency services skills. Following a disaster, these citizen-responders use their training as part of a neighborhood or workplace team to help others when emergency services providers are overwhelmed or not immediately available. CERT members provide immediate assistance to victims in their area, organize other volunteers who have not had training, and collect disaster information that will assist emergency workers with prioritization and allocation of resources when they arrive.

Purpose of the Program

CERT promotes a partnership between emergency management, response agencies and the people in the community that they serve. The goal is to train members of neighborhoods and workplaces in basic skills. CERT teams are formed and maintained as part of the emergency response capability for their area. If there is a natural or man-made event that overwhelms or delays the community's professional responders, CERT members can assist others by applying basic response and organizational skills they learned during their CERT training. These skills can help save lives and property until help arrives. CERT members can also volunteer for special projects that improve a community's preparedness and response capability.

How CERT Works

The Basic CERT training program is a 20-hour course, typically delivered one evening a week over a seven or eight week period by local jurisdictions. The course is also offered by several community colleges as a credit and also as a non-credit course. Some programs with business oriented participants may offer the course over a two or three day period during business hours.

Training sessions cover disaster preparedness, fire suppression, basic disaster medical operations, light search and rescue, disaster psychology and team organization. There is also a new module on terrorism that educates CERT members about weapons of mass destruction and CRRNE Agents (Chemical, Biological, Radiological, Nuclear and Explosive). This session will help CERT members identify situations where these agents may have been used and protective actions that they should take. Those communities interested in developing a CERT program should contact their county emergency management director/coordinator for more information. For those interested in training to become a CERT volunteer, please contact your local or county emergency management agency to verify availability of this opportunity in your local area as well as for training dates and locations.

Campus and Teen Programs

There are also programs available for Campus CERT, which applies the established CERT model to the college and university environment; as well as a Teen CERT program to assist others in their schools, neighborhood or workplace following an event when professional responders are not immediately available to help.

Campus CERT Website:
http://www.c-cert.msu.edu/about-cert.htm
Teen CERT Website:
http://www.teencert.org/index.php

Recovery Process

Recovery following disaster is the most time consuming element of the emergency management cycle - preparedness, response, recovery, mitigation. In recovery we assist those communities impacted by an event in obtaining reimbursement for all eligible costs associated with the repair and restoration of public facilities impacted by the declared event.

Home Elevation: Where Do I Start?

Most types of homes can be elevated above floodwaters, including wood frame, brick, slab-on-grade and homes with crawlspaces. Elevation is an extremely reliable flood protection method. In Arizona, the height of the lowest floor and attendant utilities must be elevated at or above the Arizona Regulatory Flood Elevation (1-foot above the 100-year base flood elevation). If the structure is a manufacture home, the bottom of the frame and attendant utilities must be elevated at or above the Arizona Regulatory Flood Elevation. Contact your community's local Floodplain Administrator for details.

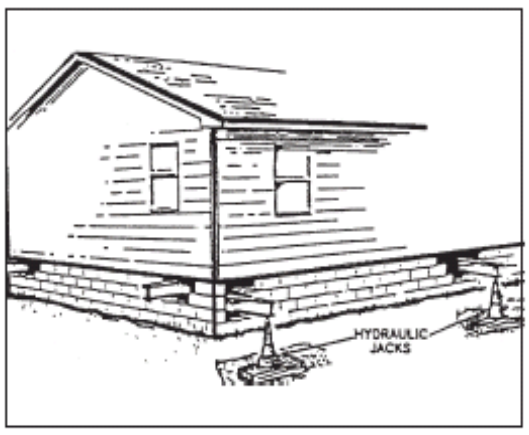


Figure 1: I-beams are placed under lifting points perpendicular to floor joists with a second set beneath for uniform lifting.

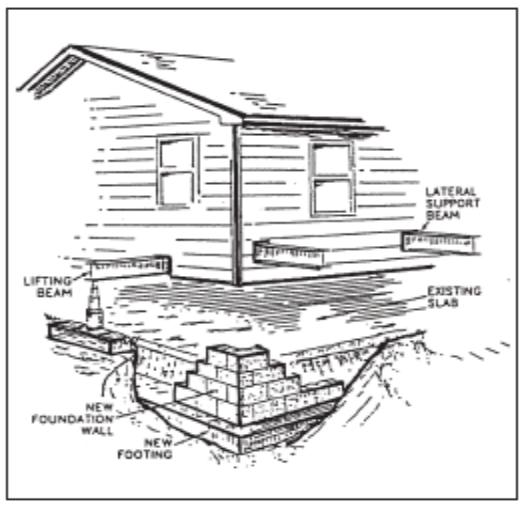


Figure 2: Lifting beams are placed under bearing walls and posts. The house is uniformly lifted using hydraulic jacks.

Elevating a home requires use of professional plumbers, electricians, house movers, contractors, and structural engineers to help you design your new foundation and obtain a permit from your community's building department and floodplain management department. Because the new foundation may still be subject to flooding, it is extremely important that it be structurally designed to withstand lateral (sideways) forces such as fast-flowing currents and the impact of waterborne debris. A foundation with an enclosure or crawlspace that is subject to flooding will require permanent flood openings.

Building Permits

Local codes generally require a building permit before you make repairs or flood-proofing upgrades to your structure. Usually you need to get a permit for electrical work, plumbing, and repairs for structural damage (such as foundations and exterior walls). If your community has a floodplain management ordinance, you may also need a floodplain development use permit.

Because your property may be located in a mapped floodplain, you will also want to check with the permit department and the floodplain management department prior to grading or building. Your community will have maps called Flood Insurance Rate Maps (FIRMs) that will show the floodplain in your community. This flood area is known as the Special Flood Hazard Area (SFHA). The National Flood Insurance Program (NFIP), and most local and state building codes require that a building in the floodplain that is substantially damaged or substantially improved be treated as new construction. In Arizona, the lowest floor must be elevated to or above the Arizona Regulatory Base Flood Elevation (1-foot above the 100-year base flood elevation). The bottom of the structural frame for a manufactured home must be elevated at or above the Arizona Regulatory Flood Elevation. Utilities must also be protected and the most common way to protect utilities is to elevate them at or above the Arizona Regulatory Base Flood Elevation.

Substantial damage means the cost to restore your house to its "before damaged" condition would equal or exceed 50% of the market value of your house before the damage occurred. Substantial improvement means any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50% of the market value of the structure before the start of construction of the improvement. Combining a repair with an improvement where the total cost equals or exceeds 50% of the market value of your house before the damage occurred will also trigger the requirement to elevate.

How high should I elevate my home?

In Arizona, the lowest acceptable elevation for your house will be to elevate at or above the Arizona Regulatory Flood Elevation (1-foot above the 100-year base floor elevation). You will need to obtain the services of a professional surveyor to locate and certify the elevation of the 100-year flood at your house.

Some County Flood Control Districts and communities have elevation requirements that exceed the Arizona Regulatory Flood Elevation. For instance, they may require an elevation equal to the Arizona Regulatory Flood Elevation plus one foot (or some other value) or an elevation equal to that observed for an historical flood. If your Floodplain Administrator requires this, the procedure for determining the acceptable elevation for your house is the same as given above. If your local agency requires your house to be elevated to a height equal to that of an historical flood, they will have to provide that elevation to you. You will then need to obtain the services of a professional surveyor to locate and certify that elevation at your house.

Finally, you may desire to elevate your house to some level above that is required by your Floodplain Administrator. You should be aware that any flood elevation given for your house may be exceeded by a particular flood for several reasons. First, the magnitude (amount of water flowing) of the 100-year flood may increase as more years of data are collected and statistical analyses of flood events are revised. Second, the analysis of the 100-year flood elevations shown for the river responsible for flooding of your property is based on channel conditions at the time of the analysis. If the channel conditions have changed since the analysis, the elevation of the 100 -year flood given for your house may also have changed by several inches. You may want to elevate your house using a "factor of safety" equal to one or more feet above the elevation required by your Floodplain Administrator because base flood elevations may not be precise and many factors could raise the level of flooding (such as ice jams or debris). In many instances, the difference between the 100-year flood and the 500-year flood (a flood having a probability of occurrence in any year of 0.2%) is less than one foot. Furthermore, the savings on flood insurance can exceed 60% through elevation. Adding this "factor of safety" may protect your house against floods with extreme probabilities of occurrence, provided log, debris, or ice jams do not occur.

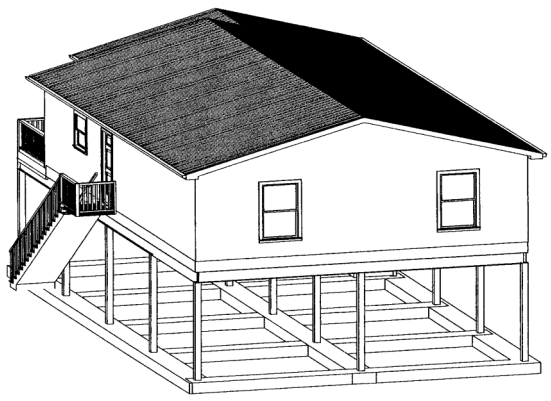


Photo: FEMA

How Do I Hire a Contractor?

How Do I Hire a Contractor?

Sleuthing

If you have been satisfied with work done before by a local licensed contractor, you may want to use that firm again. If you have not used a contractor before, or if you were unhappy with a previous experience, you may have to do some investigating to increase your chances of getting a reliable professional.

· Ask the contractor for proof of insurance. Insurance is usually required by the state and should include a completion bond, disability and worker's compensation insurance. Otherwise, you may be liable for accidents occurring on your property.

· Check on the firm's reputation. Ask the local Better Business Bureau, homebuilders association, or building trades council because they may be able to tell you if the firm has had unanswered complaints filed against it. Also, reputable contractors should be willing to provide names of previous customers so ask for references. Contact some of them and ask how well they were satisfied with the job.

Get it in Writing

No matter how well you know the contractor or how much you trust him/her, get everything related to the job in writing.

· Get a written estimate. You will need to give the contractor a written scope of work. This should include everything you expect the contractor to do. Be sure to be very thorough with your work request and have plans and materials specified. The contractor will need to know exactly what materials he will be expected to purchase on your behalf and specifically how much of the labor you expect him to complete. Some contractors may charge a fee for an estimate.

· Get more than one contractor to give you an estimate for the job. Even with the same work description you will find that every contractor will give you a different price. When comparing estimates look at them closely and be sure each contractor is pricing out the same work and materials for you.

·Obtain a contract. The contract should be complete and clearly state all the work, costs, and payment schedule. Never sign a blank contract or one with blank spaces. It may be worthwhile to have your attorney look it over if a lot of money is involved.

· Ask for guarantees. Any guarantees from the contractor should be written into the contract. It should include what is guaranteed, who is responsible for the guarantee (dealer, contractor, manufacturer), and the length of time the guarantee is valid.

· Get a final contract. A signed contract is binding on both you and the contractor. Do not sign completion papers or make the final payment until the work is completed to your satisfaction and approved by your local building inspector.

Beware of Disreputable Activities

Areas recovering from floods are often prime targets for less-than-honest business activities. Here are some points to help safeguard against such practices:

- Beware of "special deals" offered after a disaster by contractors you don't know.
- Beware of unknown contractors wanting to use your house as a "model home."
- Do not sign any contract under pressure by a salesperson. Federal law requires a three day cooling-off period for unsolicited door-to-door sales of more than $25. If you choose to cancel such a contract within three business days of signing it, send your cancellation by registered mail.
- Beware if you are asked to pay cash on the spot instead of a check made out to the contracting company. A reasonable down payment is up to 30% of the total project cost.
- Your contractor should call you or a qualified observer to inspect hidden work (e.g., sewers or basement wall) before it is covered over. Most building departments must inspect electrical and plumbing lines before the walls are covered with wallboard or paneling.

Flooding and Flash Flooding

Flooding and flash floods are a real danger in Arizona. Every year, people are injured; some lose their lives because they are caught off guard by storms and rushing floodwaters.

BE prepared

Keep family and property safe from floodwaters:

- Do not build in a floodplain unless you elevate and reinforce your home.
- Elevate the furnace, water heater, electric panel, receptacles, and elevate or properly anchor propane tanks if susceptible to flooding.
- Install "check valves" in sewer traps to prevent floodwater from drain back-ups.
- Construct barriers or stack sandbags to stop floodwater from entering buildings.
- Seal basement walls with waterproofing compounds to avoid seepage.

BE informed

Flash floods can occur in Arizona with no rain in sight. A storm that is miles away can produce flash flooding:

- Know where flash flooding has occurred; be cautious in areas prone to flooding.
- If you must evacuate, secure your home and move essentials to an upper floor.
- Turn off utilities at the main switches or valves if asked to do so.
- Do not walk through moving water; instead, choose a route with still water if possible.

Many injuries take place after a flood. These tips will help keep your family safe in the aftermath:

- Stay away from power lines and electrical wires.ave your electricity turned off by the power company.
- Beware of animals, especially snakes.
- Look before you step. After a flood, the ground and floors are covered with debris.
- Wait before entering a structure damaged by flooding.
- Do not drive into flooded areas.
- If floodwaters rise around your car, abandon it and move to higher ground.

BE curious

For more information on flood preparedness, visit:

- www.dem.azdema.gov
- www.floodsmart.gov
- www.azwater.gov
- www.azein.gov
- www.justincasearizona.com
- www.ready.gov
- www.cdc.gov
- www.weather.gov

Earth Fissure FAQs

What do I do once I know there is an earth fissure on my property?

Consult with a geotechnical company or consultant to review your options. Make sure that the company has qualified, registered geologist and engineers who have experience working with earth fissures. There are ways of managing earth fissures that allow residents and earth fissures to coexist.

Why are earth fissures in these new these areas?

Geologists have been aware of earth fissure hazards since the early 1960s. Arizona's population is rapidly increasing and people are moving into former agricultural lands and encroaching upon earth fissures. As a result, more and more people are at risk from the hazards associated with earth fissures.

Why is AZGS mapping earth fissures?

The best way to manage earth fissures is to avoid building near them. This requires detailed mapping to identify fissure locations. Our maps provide the public with a first line of defense against these geohazards.

Do earth fissures change over time?

Earth fissures are dynamic, they constantly change in response to movement in the subsurface (continuing subsidence) and the activity in the surface (runoff from precipitation). Runoff can quickly widen and deepen existing earth fissures.

Should I build over an earth fissure?

It is not recommended to build on top of a known earth fissure; you should build as far from the fissure as possible. Fissures are easily destabilized and frequently occur in closely spaced sets. Remember, earth fissures are dynamic and capable of sudden change in length and width.

What is the recommended set-back for earth fissures?

Set-back policy, if it exists at all, is established by county and municipal governments, and this varies from one location to the next. The Arizona Geological Survey does not currently sanction any established set-back distance; we simply don't know enough about earth fissures yet to advise the public. We encourage prudence on the part of builders, realtors, and home owners in building near earth fissures.

Where can I learn more about where earth fissures exist?

Visit the AZGS Earth Fissure Center at www.azgs.az.gov/EFC for earth fissure planning maps and reports. There you'll also find a link to the Arizona State Land Dept. 1:12,000 scale earth fissure map series.

The Earth Fissure Viewer is situated at http://services.azgs.az.gov/OnlineMaps/fisures.html

EFV is an interactive map tool displaying over 300 miles of earth fissures in Cochise, Maricopa, Pima and Pinal Counties. The Earth Fissure Viewer includes a Google search engine that allows users to zoom directly to their own address and examine the surrounding area for fissures.


Photo: AZGS

Earth Fissure Priority Mapping Areas

For locations, see the AZGS Earth Fissures Planning Maps for Cochise, Maricopa, Pima and Pinal Counties online at www.azgs.az.gov/EFC.

1. Chandler Heights (Pinal & Maricopa)
2. Apache Junction (Pinal)
3. Luke (Maricopa)
4. Toltec Buttes (Pinal)
5. Picacho (Pinal)
6. Heaton (Pinal)
7. White Horse Pass (Pinal)
8. Signal Peak (Pinal)
9. Tator Hills (Pinal)
10. Greene Wash (Pinal)
11. Sacaton Butte (Pinal)
12. Scottsdale/NE Phoenix (Maricopa)
13. Pete's Corner (Pinal)
14. Santa Rosa Wash (Pinal)
15. Sulphur Springs North (Cochise)
16. Three Sisters Buttes (Cochise)
17. Bowie-San Simon (Cochise)
18. Dragoon Road (Cochise)
19. Wintersburg (Maricopa)
20. Marana (Pima)
21. Harquahala Plain (Maricopa)
22. Mesa (Maricopa)


Photo: AZGS


Photo: AZGS

Hazards Associated with Earth Fissures

Earth fissures and associated erosional gullies pose a hazard to people, property and live stock. Some common and potential hazards include:

- Cracked or collapsing roads
- Severed or deformed railroad tracks
- Broken pipes
- Damaged will casing or wellhead
- Broken canal liners
- Disrupted drainages
- Human injury
- Cracked foundations/separated walls
- Livestock; pet injury or death
- Contaminated groundwater aquifer

What is Urban Flooding?

Recent flooding in Arizona was not limited to the major rivers and floodplains. In fact, urban flooding also posed a significant hazard and caused damage. In urbanized areas, paved streets and other impervious surfaces prevent natural absorption into the ground. Storm water runs from hard surfaces such as rooftops, paved streets, highways, and parking lots directly into sewer systems that quickly become inundated causing them to backup. As development increases, more of the natural absorption process of the ground is diminished. The result is more water being channeled into sewer lines than can be processed—causing an urban flood.

Innovation in urban flood mitigation is most evident in the form of Low Impact Development (LID). LID attempts to restore the natural drainage function by encouraging localized treatment of water on site at both residential and nonresidential structures. Instead of channeling rain/storm runoff directly into municipal drains, Low Impact Development uses natural absorption by way of vegetated swales, smaller retention ponds, and efficient use of non-impervious ground on a site-by-site basis. It has been described as “rain water harvesting” because it uses the water on site (either through rain barrel storage, rain gardens, or natural ground filtration) to intended locations away from the foundation. By reducing the amount of water to be handled by the sewer system, and reducing the amount of non-treated runoff that enters natural waterways, LID promotes local flood mitigation.

There are many benefits of LID. It mitigates urban flooding, preserves natural landscape features by minimizing environmental disturbance; reduces the effect of hard surfaces, and facilitates localized retention and infiltration opportunities.


Photo: ADWR

Debris-Flow Hazards

Some landslides move slowly and cause damage gradually, whereas others move so rapidly that they can destroy property and take lives suddenly and unexpectedly. Debris flows, sometimes referred to as mudslides, mudflows, lahars, or debris avalanches, are common types of fast-moving landslides. These flows generally occur during periods of intense rainfall or rapid snowmelt. They usually start on steep hillsides as shallow landslides that liquefy and accelerate to speeds that are typically about 10 mph, but can exceed 35 mph. The consistency of debris flows ranges from watery mud to thick, rocky mud that can carry large items such as boulders, trees, and cars. Debris flows from many different sources can combine in channels where their destructive power may be greatly increased. They continue flowing down hills and through channels, growing in volume with the addition of water, sand, mud, boulders, trees, and other materials. When the flows reach canyon mouths or flatter ground, the debris spreads over a broad area, sometimes accumulating in thick deposits that can wreak havoc in developed areas.

Debris flows are fast-moving landslides that occur in a wide variety of environments throughout the world. They are particularly dangerous to life and property because they move quickly, destroy objects in their paths, and often strike without warning. U.S. Geological Survey (USGS) scientists are assessing debris-flow hazards in the United States and elsewhere, and developing real-time techniques for monitoring hazardous areas so that road closures, evacuations, or corrective actions can be taken.


Photo: ADEM


Photo: ADEM

Preventing Flooding Around Your Home


Photo: ADEM

There are a wide range of steps you can take around your property to reduce the impact of stormwater and even reduce the chances of floodwaters entering your home.

Storm Drains

Take time to clean out the storm drains along your street. Keep sticks, lawn clippings, leaves and other debris away from drains. Take advantage of yard waste collection services offered in your community.

Depression Gardening

When possible, use the lowest point on your property for planting a garden. Let gravity help keep your garden green.

Rain Barrels

Rain barrels collect rain from your roof. It is free water that you can use in the summer months around your yard. It also helps keep the ground around your home from getting oversaturated.

Photo: Ryan Ike—FEMA

Stupid Motorist Law

When flooding occurs in Arizona, whether urban or in rural areas, drivers should be especially aware and respectful of barricaded road crossings. Arizona Revised Statute 28-910, otherwise known as the Stupid Motorist Law,” was passed in 1995 and states that any motorist who becomes stranded after driving around barricades to enter a flooded stretch of roadway may be charged for the cost of his/her rescue. In such cases, if public emergency services (such as a fire department, or paramedics) are called to rescue the motorist and tow the vehicle out of danger, the cost of those services can be billed to the motorist.

FLOOD Safe

Manufactured Homes, Recreational Vehicles, Park Trailers and Floodplains.

Manufactured Homes

Manufactured or (Mobile) homes are largely assembled in factories and then transported to a permanent foundation.

Arizona law requires that manufactured homes that are placed on site or substantially improved shall:

A. Be elevated so that the bottom of the structural frame or the lowest point of an attached appliance is at or above the regulatory flood elevation (1' above the Base Flood Elevation) and;
B. Be securely anchored to a foundation to resist flotation, collapse or movement. Methods of anchoring include the use of over-the-top or frame ties to ground anchors.

Don't Be a Flood Victim

- Floods are the most common and destructive natural hazard in Arizona.
- A local Floodplain Development Permit is required for the placement, improvement, or repair of a manufactured home, park trailer or recreational vehicle (if on-site for 180 consecutive days or greater) within a regulatory floodplain.
- Ensure utilities are elevated and propane tanks are either elevated or properly anchored to resist floatation.
- Prior to ANY activity in the FLOODWAY, contact the local floodplain department.
- Local departments have maps called Flood Insurance Rate Maps (FIRMs) that show the floodplain and floodway for your area.

Recreational Vehicles

Recreational Vehicles (RV) are movable, temporary living quarters designed for travel and seasonal recreational use. RVs are not considered structures and are NOT eligible for flood insurance coverage.

Examples of RVs are:
· Camping trailers
· Fifth-wheel trailers
· Motor homes
· Truck campers
· Travel trailers

Floodplain management regulations stipulate that RVs placed on-site shall:

A. Be on site for less than 180 consecutive days, OR
B. Be fully licensed and "Road Ready," OR
C. Comply with elevation and anchoring requirements for Manufactured Homes.

"Road Ready" means ready for highway use. The RV has wheels, is self-propelled or towable, and has quick disconnect utilities. A "Road Ready" RV can evacuate from a flood prone area given sufficient notice.

Park Trailers

Park trailers typically remain on-site for several years or more, and are neither licensed nor "Road Ready."

Park trailers are often placed on permanent foundations and can have attached stairs, decks, and screened porches—a trait more commonly shared with manufactured homes.

Other park trailer characteristics include:

- No quick disconnect utilities because bathrooms and kitchens are fully functional; and

- Are equipped with welded, tie-down brackets and are often secured to a site.

Flood Insurance

- Flood losses are not covered under homeowners insurance policies
- Owners of manufactured homes are eligible for flood insurance coverage.
- Separate contents coverage is available.
- Renters can get flood insurance to cover the contents of a home or business.
- Recreational vehicles and park trailers are NOT eligible for flood insurance coverage.
- For more information about Flood Insurance, visit: http:www.floodsmart.gov

Information

ARIZONA DEPARTMENT OF WATER RESOURCES

To view flood maps or to obtain local flood information, contact the county flood control district in your area.

Apache County: (928) 337-4364
http://www.co.apache.az.us/

Cochise County: (520) 432-9300
http://cochise.az.gov/

Coconino County: (928) 774-5011
http://www.coconino.az.gov/

Gila County: (928) 425-3231 ext. 8509
http://www.gilacountyaz.gov/

Graham County: (928) 428-0410
http://www.graham.az.gov/

Greenlee County: (928) 865-2310
http://www.co.greenlee.az.us/

La Paz County: (928) 669-6115
http://www.co.la-paz.az.us/

Maricopa County: (602) 506-1501
http://www.fcd.maricopa.gov/

Mohave County: (928) 753-9141
http://www.co.mohave.az.us/

Navajo County: (928) 524-4000
http://www.navajocountyaz.gov/

Pima County: (520) 243-1800
http://rfcd.pima.gov/

Pinal County: (520) 509-3555
http://pinalcountyaz.gov/

Santa Cruz County: (520) 375-7830
http://www.co.santa-cruz.az.us

Yavapai County: (928) 771-3214
http://www.co.yavapai.az.us

Yuma County: (928) 373-1010
http://www.co.yuma.az.us

FLOOD Safe

Local Emergency Officials

In a life-threatening emergency, dial 911 or the local emergency medical service officials:

Nearest Police Department:

Address:

_____

_____

Telephone:

(_____)_____

Nearest Fire Department:

Address:

_____

_____

Telephone:

(_____)_____

Nearest Hospital:

Address:

_____

_____

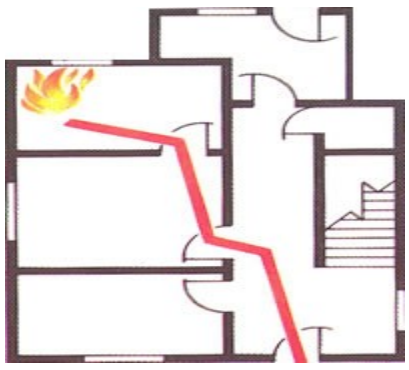
Telephone:

(_____)_____

Household Disaster Plan Checklist

Consider developing a disaster plan with your household members that outlines what to do, how to find each other, and how to communicate in an emergency.

- Decide where your household will reunite after a disaster. Identify two places to meet: one right outside your home and another outside your neighborhood, such as a library, community center, or place of worship.
- Make sure everyone knows the address and phone number of your second meeting place.
- Know and practice all possible exit routes from your home and neighborhood.



- Designate an out-of-state friend or relative that household members can call if separated during a disaster. If phone circuits are busy, this out-of-state contact can be an important way of communicating between household members. When local phone circuits are busy, long-distance calls may be easier to make.
- Account for everybody's needs, especially seniors, people with disabilities, and non-English speakers.

Family Emergency Supply Kit

Everyone should have some basic supplies on hand in order to survive for at least three days if an emergency occurs. The following is a listing of some basic items that every Emergency Supply Kit should include. However, it is important that individuals review this list and consider where they live and the unique needs of their family in order to create an Emergency Supply Kit that will meet their needs. Individuals should also consider having at least two Emergency Supply Kits, one full kit at home and smaller portable kits in their workplace, vehicle or other places they spend time.

Recommended items to include in a basic Emergency Supply Kit:

- ☐ Water, one gallon of water per person per day for at least three days, for drinking and sanitation
- ☐ Food, at least a three-day supple of non-perishable food
- ☐ Battery-powered or hand crank radio and a NOAA Weather Radio with time alert
- ☐ Flashlight
- ☐ Extra batteries
- ☐ First aid kit
- ☐ Whistle, to signal for help
- ☐ Dust mask, to help filter contaminated air and plastic sheeting and duct tape to shelter-in place

Additional items to consider adding to an Emergency Supply Kit:

- ☐ Prescription medications and glasses
- ☐ Infant formula and diapers
- ☐ Pet food and extra water for your pet
- ☐ Important family documents such as copies of insurance policies, identification and bank account records in a waterproof, portable container
- ☐ Cash or traveler's checks and change
- ☐ Emergency reference material such as a first aid book
- ☐ Sleeping bag or warm blanket for each person. Consider additional bedding if you live in a cold-weather climate
- ☐ Complete change of clothing including a long sleeved shirt, long pants and sturdy shoes. Consider additional clothing if you live in a cold-weather climate
- ☐ Household chlorine bleach and medicine dropper-when diluted nine parts water to one part bleach can be used as a disinfectant. In an emergency, you can use it to treat water by using 16 drops of regular household liquid bleach per gallon of water. Do not use scented, color safe or bleaches with added cleaners
- ☐ Fire extinguisher
- ☐ Matches in a waterproof container
- ☐ Feminine supplies and personal hygiene items